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ABSTRACT

Data from the National Longitudinal Study of the Class of 1972 were analyzed to determine the relationship between student achievement and self-attitudes. Indices of background and repeated measures of achievement and self-attitudes are available for 1972, 1973, 1974, and 1976 on 4,628 subjects as they moved through their undergraduate years. To isolate the achievement/attitude relationship, a two-stage controlled-entry hierarchical multiple regression equation was generated for each of the 4 years. With achievement as the criterion variable, background variables were entered as the first stage and attitudes as the second stage. The increments of change in the squared multiple correlations from the first stage to the second stage for each of the 4 years indicated that the achievement/attitude relationship sustains over time with shared variance percentages in the 1.20 to 1.67 range after background is controlled. (TJH)

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ACADEMIC ACHIEVEMENT AND SELF ATTITUDES
A Longitudinal Study with Background Controlled

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ABSTRACT

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Educational practice has invested heavily in the presumption that interventions disigned to improve of students' self referent attitudes are worthy of educational resources. In large measure Special Education, Guidance, Psychological Services and Student Support Services find justification in this presumption.

Part of the rationale involves the assertion that such attitudes (most frequently, self concept and locus of control) are related to the more summative educational product, achievement. The compelling folk wisdom holds such attitudes to be a cause of achievement. Although the literature offers some support for such a relationship and for causation from attitudes to achievements, it is not evident that the relationship sustains over time when the non-intervenable background covariates (aptitude, race, socio-economic status and sex) are controlled.

I analyzed data from The National Longitudinal Study of the Class of 1972. Indices of background and repeated measures of achievement and self attitudes across four years (1972, 1973, 1974 and 1976) are available for 4,628 subjects as they move through their baccalaureate years.

To isolate the achievement/attitude relationship, a two-stage controlled-entry hierarchical multiple regression equation was generated for each of the four years. With achievement as the criterion variable, background variables were entered as the first stage and attitudes as the second stage. The increments of change in the squared multiple correlations from Stage 1 to Stage 2 for each of the four years indicate that the achievement/attitude relationship sustains over time with shared variance percentages in the 1.20 to 1.67 range after background is controlled.

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Theory

The term instructional theory entered the literature with the Gagné and Rohwer essay in the 1969 Annual Review of Psychology. The theory has become a descriptor for investigations into the identification of components of learners' schooling experience, the precursors and outcomes of this experience, and the relations among these phenomena. In considering both precursors and outcomes, the various models proposed give prominence to attitudes. Gagné identified five categories of interrelated "outcomes of learning" (Gagné, 1975). Among these are attitudes, "...acquired internal states that influence the choice of personal actions toward some class of things, persons or events." Among such attitudes are beliefs about self.

Beyond instructional theory, there are other theoretical formulations which bear on the significance of attitudes and their relation to other achievement outcomes. Weiner (attribution theory) cited causal attributes (i.e. causes that one attributes to one's own and to other's behavior) as mediating determinants of achievement products (Weiner et al., 1971; Weiner, 1972; Weiner, 1974). In self efficacy theory, Bandura (1982) cited self efficaciousness judgments as the primary determinants of achievement products.

The debate continues within these theoretical frameworks and elsewhere (Calsyn and Kenny, 1977; Moyer, 1979; Keith and Pottebaum, 1986) as to the direction and strength of causation between attitudes and other achievements. The most frequent assertion is that attitudes cause achievements. This compelling assumption has become part of our educational folk widsom and part of the rationale for national level compensatory education programs (Scheirer and Kraut, 1979). I did not enter this causation debate but rather I addressed the initial presumption which underlies it: that these two types of educational outcomes have a significant positive relation. The presumption that a significant relation exists is the common feature across theoretical formulations and the causality debate.

Practice

Educational practice has made a heavy investment in the presumption that a significant positive relationship exists. It is commonplace to allocate resources to interventions that improve attitudes (particularly self referent attitudes like self concept and locus of control). Frequently, practitioners in Special Education, Guidance, Psychological Services and Student Support Services argue that, it is self attitudes' effect on achievement that makes them worthy of resource allocation.

Literature

Support for the presumption that achievements and self attitudes are related is available in the literature. When attitudes are operationalized as a wide array of self referent measures and other educational outcomes are operationalized as grades or academic achievement measures, they are found to share significant variance. Purkey, in his review of the self concept literature (1970), concluded that a positive achievement/self concept relation was existent across diverse samples despite the use of different measures for the two constructs. With locus of control as the attitude construct, a similar positive relation with achievement was reported by Joe (1971), McGhee and Crandall (1968), and Nowicki and Segal (1974).

Although the findings are not consistent, the attitude/achievement relation is markedly reduced when educational non-intervenable background variables are considered. Watkins (1982) reiterated previously stated recommendations from the literature that there needs to be control for precurser variables which would inject spuriousness into inquiries concerning the attitude and achievement relationship. Campbell (1967), Bledsoe (1967), Binder, Jones and Strowig (1970), and Nowicki and Strickland (1973) reported evidence concerning sex differences for the attitude/achievement relation. The influence of aptitude on the attitude/achievement relation was reported by Brookover, Thomas & Paterson (1964) and Clifford & Cleary (1972). The effects of race on the attitude/achievement relation was reported by Brookover, Erickson and Joiner (1967). The separate effects of socio-economic status (SES) on attitudes and achievement was reported by Cicirelle (1977), Bar-Tal (1978), and Schwarzweller & Lyson (1974).

Research Question

Among the uncertainties that remain, two are prominent: Is there long term durability of the relation between self attitudes and achievement, and does this relation sustain under conditions of controlled background? I investigated the following question: Do self-referent attitudes have sustained effects, over time, on educational achievement independent of the effects of background and aptitude? Thus the substantive hypothesis is Self referent attitudes and achievement have a sustained positive relationship over time even after the confounding effects of background and aptitude have been controlled.

Sample

The sample of 4,628 subjects was drawn from The National Center for Education Statistics' National Longitudinal Study of the Class of 1972 (NLS). The selection of subjects was based upon the availability of the requisite data across the years the subjects were likely to be involved in schooling (1972, 1973, 1974, 1976).

Variables

The problem under consideration required measures for three constructs: summative educational achievement, self referent attitudes, and educationally non-intervenable co-variates of these two types of educational outcomes.

To represent summative educational achievement, the NLS provides retrospective self-reported grade averages for 1972, 1973, 1974 and 1976.

To represent self referent attitudes, the NLS provides four items for each of two dimensions of self. Self concept, conceptualized as a potentially multi-dimensional global construct, has been defined by Coopersmith (1967, p. 4) as "the evaluation which the individual makes and customarily maintains with regard to himself." Four item/statements intended as a sample inventory of this construct were selected from among those Rosenburg originally included in his self esteem inventory (Rosenburg, 1965). Locus of control, which has come to be conceptualized as a dimension of self (Kanouse, Haggstrom, Blaschke, Kahan, Lisowski and Morrison, 1980), has been defined by Rotter (1966, 1975) as a construct specifying the placement one makes of control

over one's own reinformcement along a continuum of internality vs. externality. This dimension of self is an attempt to operationalize the concept of the self as an efficacious agent of one's own fate, (McGhee and Crandall, 1968). The four item/statements intended as a sample inventory of this construct are borrowed from the instruments used by Coleman et al. (1966) for their investigation of educational opportunity. The items are similar to some of those developed by James (1957) for the James-Phares' scale, and Rotter (1966) for the Rotter I-E scale.

The third type of variable needed for the present study is characterized as co-varying with educational outcomes and yet, inasmuch as they are givens or precursors, they are not amenable to educational intervention. The NLS data provides a plethora of such information. Those variables of interest for this study are the fixed subject traits, sex and race; an index of the social and economic position of the subject's family, SES; and an index of intellectual facility for academic achievement (aptitude). The sex and race measures were straightforward self report survey items. The SES measure was a composite variable constructed from father's education, mother's education, father's occupation, family's income, and a survey of household possessions. The aptitude measure was constructed by the Educational Testing Service from their item bank for scholastic aptitude and consisted of 231 items across six problem solving subdomains with 69 minutes of administration time.

The metric efficiency of all the measures is commensurate with that reported in the literature for measures typically used to represent these constructs. Reliability and validity estimates for most measures are coefficients in the .8 and .9 range. For the attitude measures the estimates are in the .6 and .7 range. For four of the SES components the coefficients are .7 and .8 . The fifth component, student report of father's income, when validated against father's report appeared to be the weakest measure. Kyaser and Summers (1973) reported coefficients as low as .2 for similar subjects with this type of measure.

Analysis

I estimated relationships over time self referent attitudes and other achievements These estimates were kept free of the influence of the four selected precurser

variables. To isolate the attitude/achievement relationship, I generate a two-stage controlled-entry hierarchical multiple regression equation for each of the four years of data. With achievement as the criterion variable, background variables were entered as the first stage and then attitudes were added as the second stage. The increments of change in the squared multiple correlations from Stage 1 to Stage 2 for each of the four years of data indexes the achievement/attitude relationship. Thus the analytic hypotheses assert that the differences between Stage 1 and Stage 2 would be > 0 for each of the four time periods under consideration. The testable null hypotheses are of the form:

$$\text{STAGE } 2 \quad - \quad \text{STAGE } 1 \quad = \quad 0 \quad p < .01$$

or

$$R_{y.1234\,56} \quad - \quad R_{y.1234} \quad = \quad 0 \quad p < .01$$

Where R is the multiple correlation estimate; y is the criterion variable, GPA; 1,2,3 and 4 are the background variables of sex, race, SES and aptitude, respectively; and 5 and 6 are self referent attitude variables of self-concept and locus of control, respectively.

Results

Within-year correlations were used to generate equations for each of the four time periods. The null hypothesis for each of the four time periods can be rejected (Table 1). In each case, self attitudes share > 1% of the GPA variance after the spurious influence of background has been controlled.

Conclusions and Implications

Thus achievements and attitudes have a small but significant relationship after background influences have been controlled and this relationship sustains over time in young adult students.

Of particular interest is the stability of the GPA variance accounted for by self attitudes across the four time points. The percentages of shared variance are in the narrow range of 1.20% to 1.67%.

Predictably, background accounts for its highest proportion (30.69%) in the year it was measured. It is reasonable to assume that, as the temporal distance from the time of measurement increases, the index of association would decrease. This assumption is warranted for the period between 1972 and 1973; but, thereafter, the proportions remain relatively stable for background even though the temporal distance from the measurement time increases. Thus stability over time appears to be an apt descriptor for this attitude/achievement relation.

I considered whether the interactions amoung the four background variables were additional sources of spuriousness which affected the attitude/achievement relationship. I investigated this possibility by entering all two-way, three-way, and four-way multiplicative interaction terms into the equations before attitudes. In all cases, these blocks accounted for miniscule proportions in the .1% range. Similarly I considered whether the the two attitude variables might interact such that the proportion of GPA variance attributable to attitudes would increase. Multiplicative interaction terms were generated as above and entered after the attitude block for each year. Again, in all cases, the effects were insignificant.

The baccalaureate character of the subjects limits generalization of these findings to younger students. Also the small proportions of shared variance may be underestimates, because of the inefficiency typical of attempts to measure attitudes and socio-economic status. In spite of these limitations, it seems appropriate to conclude that the small proportions of uncontaminated shared variance between self attitudes and academic achievements severely inhibits any hope of continuing meaningful investigations of causality between them using the availible post hoc shared variance analysis techniques. The recent contribution of Keith et al. (1986) to the causality debate again reports shared variance estimates in only the 2% range. Such small proportions of shared variance, do not lend themselves to the argument that improving self attitudes will to bring about improvements in academic achievements. A more tenable position is to argue for the improvement of self attitudes as a legitimate educational end in itself, rather than as a means to better academic achievement.

TABLE 1
Two Block Hierarchical Regressions On Four Years of Grade Point Average

YEAR	SOURCE	BetaIn	R	R sq.	F ratio	P	Increment of R sq. Change (% Shared Variance Gain)
1972	Block 1: BACKGROUND			.3069	511.664	<.001	
	sex	.1924					
	apt	.5156					
	ses	-.0620					
	race	-.0268					
	Block 2: ATTITUDE			.0167	56.972	<.001	1.67%
	concpt72	.1158					
	locus72	.0625					
			.5688	.3235	368.360	<.001	
1973	Block 1: BACKGROUND			.1228	161.777	<.001	
	sex	.1345					
	apt	.3216					
	ses	-.0378					
	race	.0046					
	Block 2: ATTITUDE			.0163	43.793	<.001	1.63%
	concpt73	.1016					
	locus73	.0816					
			.3730	.1391	124.446	<.001	
1974	Block 1: BACKGROUND			.1240	163.633	<.001	
	sex	.1444					
	apt	.3175					
	ses	-.0058					
	race	.0541					
	Block 2: ATTITUDE			.0120	32.033	<.001	1.20%
	concpt74	.0960					
	locus74	.0560					
			.3688	.1360	121.231	<.001	
1976	Block 1: BACKGROUND			.1528	208.482	<.001	
	sex	.1476					
	apt	.3585					
	ses	.0131					
	race	.0542					
	Block 2: ATTITUDE			.0137	38.017	<.001	1.37%
	concpt76	.1102					
	locus76	.0425					
			.4081	.1665	153.886	<.001	

(N = 4,628)

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